PURPOSE AND USE OF PROCESS INDUSTRY PRACTICES

In an effort to minimize the cost of process industry facilities, this Practice has been prepared from the technical requirements in the existing standards of major industrial users, contractors, or standards organizations. By harmonizing these technical requirements into a single set of Practices, administrative, application, and engineering costs to both the purchaser and the manufacturer should be reduced. While this Practice is expected to incorporate the majority of requirements of most users, individual applications may involve requirements that will be appended to and take precedence over this Practice. Determinations concerning fitness for purpose and particular matters or application of the Practice to particular project or engineering situations should not be made solely on information contained in these materials. The use of trade names from time to time should not be viewed as an expression of preference but rather recognized as normal usage in the trade. Other brands having the same specifications are equally correct and may be substituted for those named. All Practices or guidelines are intended to be consistent with applicable laws and regulations including OSHA requirements. To the extent these Practices or guidelines should conflict with OSHA or other applicable laws or regulations, such laws or regulations must be followed. Consult an appropriate professional before applying or acting on any material contained in or suggested by the Practice.

This Practice is subject to revision at any time.
PIP STF05501
Fixed Ladders Fabrication Details

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1. Scope

This Practice describes requirements for fabricating typical OSHA-regulated fixed ladders and cages for open structures, miscellaneous platforms, and vessels for regular operational access and egress.

2. References

Applicable parts of the following Practices, industry codes and standards, and government regulations shall be considered an integral part of this Practice. The edition in effect on the date of contract award shall be used, except as otherwise noted. Short titles are used herein where appropriate.

2.1 Process Industry Practices (PIP)

- PIP STF05520 - Pipe Guards and Handrails Fabrication Details
- PIP STF05521 - Angle Guards and Handrails Fabrication Details
- PIP STF05535 - Vessel Circular Platform Fabrication Details
- PIP STI03310 - Concrete Typical Details
- PIP STS05120 - Structural and Miscellaneous Steel Fabrication Specification

2.2 Industry Codes and Standards

- American Institute of Steel Construction (AISC)
  - ANSI/AISC 303-16 - Code of Standard Practice for Steel Buildings and Bridges
- ASTM International (ASTM)
  - ASTM A36/A36M - Standard Specification for Carbon Structural Steel
  - ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength

2.3 Government Regulations

The following government document has been used as a reference in the development of this Practice.

- U.S. Department of Labor (DOL) - Occupational Safety and Health Administration (OSHA)
  - Regulations 29 CFR 1910 Subpart D - Walking-Working Surfaces - Final Rule Published in Federal Register, Volume 81, No. 223, on November 18, 2016 (referred to as “OSHA” in this Practice)

3. Definitions

This Practice uses the same terminology as AISC and OSHA. After each definition, the source document is indicated in parentheses. “(AISC)” refers to ANSI/AISC 303-16. “(OSHA)” refers to OSHA Regulations 29 CFR 1910 Subpart D. “(PIP)” indicates PIP definitions not specifically provided by AISC or OSHA.

cage: An enclosure mounted on the side rails of a fixed ladder or fastened to a structure behind the fixed ladder that is designed to surround the climbing space of the ladder. A cage also is called a “cage guard” or “basket guard.” (OSHA)
**contract documents:** Any and all documents, including codes, studies, design documents, specifications, sketches, practices, and data sheets, that purchaser or engineer of record has transmitted or otherwise communicated, either by incorporation or reference, and made part of the legal contract agreement or purchase order between purchaser and structure/platform fabricator, ladder fabricator and/or vessel manufacturer (PIP)

**design documents:** The design drawings, or where the parties have agreed in the contract documents to provide digital model(s), the design model. A combination of drawings and digital models also may be provided. (AISC)

**design drawings:** The graphic and pictorial portions of the contract documents showing the design, location and dimensions of the work. These documents generally include, but are not necessarily limited to, plans, elevations, sections, details, schedules, diagrams and notes. (AISC)

**design model:** A dimensionally accurate 3D digital model of the structure that conveys the structural steel requirements given in Section 3.1 [of ANSI/AISC 303-16] for the building [or structure] (AISC)

**engineer of record:** Purchaser’s authorized representative with overall authority and responsibility for engineering design, quality, and performance of civil works, structures, foundations, materials, and appurtenances described in contract documents. Engineer of record shall be licensed as defined by laws of the locality in which the work is to be constructed, and be qualified to practice in the specialty discipline required for the work described in contract documents. (PIP)

**fixed ladder:** A ladder with rails or individual rungs that is permanently attached to a structure, building, or equipment. Fixed ladders include individual-rung ladders, but not ship stairs, step bolts, or manhole steps. (OSHA)

**guard fabricator:** Party responsible for providing fabricated guards for platforms in accordance with contract documents. The term guard fabricator shall apply also to guard fabricator’s subcontractor(s) and/or vendor(s). (PIP)

**ladder fabricator:** Party responsible for providing fabricated ladders and cages in accordance with contract documents. The term ladder fabricator shall apply also to ladder fabricator’s subcontractor(s) and/or vendor(s). (PIP)

**ladder safety system:** A system designed to eliminate or reduce the possibility of falling from a ladder. A ladder safety system usually consists of a carrier, safety sleeve, lanyard, connectors, and body harness. Cages and wells are not ladder safety systems. (OSHA)

**owner:** Party who has authority through ownership, lease, or other legal agreement over site, facility, structure, platform, vessel or project wherein ladders and cages will be used (PIP)

**personal fall arrest system:** A system used to arrest an employee in a fall from a walking-working surface. It consists of a body harness, anchorage, and connector. The means of connection may include a lanyard, deceleration device, lifeline, or a suitable combination of these. (OSHA)

**purchaser:** Party who awards contract to structure/platform fabricator, ladder fabricator and/or vessel manufacturer. Purchaser may be owner or owner’s authorized agent. (PIP)
side-step ladder: A type of fixed ladder that requires an employee to step sideways from it in order to reach a walking-working surface, such as a landing (OSHA)

structure/platform engineer: Engineer that performs design of structures/platforms, including ladders and cages that connect to structures/platforms. Structure/platform engineer may also perform design of ladders and cages that connect to vessels if design of ladder support and guide connections is validated by a vessel engineer. (PIP)

structure/platform fabricator: Party responsible for providing fabricated structural and miscellaneous steel in accordance with contract documents. The term structure/platform fabricator shall apply also to structure/platform fabricator’s subcontractor(s) and/or vendor(s). (PIP)

through ladder: A type of fixed ladder that allows the employee to step through the side rails at the top of the ladder to reach a walking-working surface, such as a landing (OSHA)

vessel engineer: Engineer that performs design of vessels, including ladders and cages that connect to vessels. Alternatively, vessel engineer may validate design of ladder support and guide connections to vessels for ladders and cages that are designed by a structure/platform engineer. (PIP)

vessel manufacturer: Party responsible for providing manufactured vessels in accordance with contract documents. The term vessel manufacturer shall apply also to vessel manufacturer’s subcontractor(s) and/or vendor(s). (PIP)

4. Requirements

4.1 Fixed ladders and cages shall be fabricated in accordance with PIP STS05120, this Practice, and fabrication detail drawings PIP STF05501-01 through PIP STF05501-17.

4.2 The project design documents and other contract documents specify the following information:
   a. Location and orientation of ladder and optional cage including centerline of rungs in the plane of the ladder and centerline of ladder perpendicular to the plane of the ladder
   b. Selection of Type 1 ladder base (no connection at base) or Type 2 ladder base (with connection at base) for ladders at vertical vessels. See ladder base details on drawing PIP STF05501-06.
   c. Top of bottom rung elevation for ladders at vertical vessels with Type 1 ladder base. See ladder base details on drawing PIP STF05501-06.
   d. Bottom of ladder elevation for ladders at structures/platforms and horizontal vessels, and ladders at vertical vessels with Type 2 ladder base. See ladder base details on drawings PIP STF05501-05 and PIP STF05501-06.
   e. Top of platform elevations (walking surface) for platforms serviced by ladder
   f. Locations and details for ladder support members and support connectors to structures/platforms or vessels
   g. Locations and details for ladder guide connectors to structures/platforms or vessels
   h. Whether a cage is to be provided for ladder
   i. Whether extended vertical bars are required for cage at an elevated platform
   j. Bottom of cage elevation if a cage is used
k. Width of flare at top of rails for through ladders

l. Locations of gaps between ladder segments (for continuous ladders with multiple segments)

m. Ladder safety system and/or personal fall arrest system specifications, including approved manufacturer(s) and model number(s) (if included in ladder fabricator’s scope)

n. Special fabrication details

o. Any modifications to requirements of this Practice

4.3 Unless otherwise specified, all material for ladders and cages shall be ASTM A36/A36M steel. Metric equivalents for plates, bars and structural shapes shall be as specified in contract documents as applicable.

4.4 Selection of ladder rails shall be based on guide locations shown on design documents and the unguided length criteria shown on drawing PIP STF05501-01, unless otherwise specified in contract documents.

4.5 Entire ladder and cage assembly shall be welded construction. All welds shall be smooth, continuous, and sealed. Weld spatter on rungs and rails shall be removed.

4.6 Unless otherwise specified, ladder and cage assemblies shall be galvanized after fabrication in accordance with PIP STS05120.

4.7 Alternative or additional coatings for ladder and cage assemblies (e.g., safety yellow paint), shall be in accordance with contract documents.

4.8 A self-closing double-bar safety gate, in accordance with OSHA and any other requirements specified in contract documents will be provided by guard fabricator at the opening in platform railing for all platforms serviced by ladder.

4.9 Unless otherwise specified, all bolts required for ladder and cage erection shall be provided by ladder fabricator. Bolts shall be 5/8-inch (16-mm) ASTM A307 bolts galvanized in accordance with PIP STS05120.
FOR TOP DETAIL OF SIDE-STEP LADDER, SEE STF05501-02
FOR TOP DETAIL OF THROUGH LADDER, SEE STF05501-03

TOP OF PLATFORM
(WALKING SURFACE)

TOP OF RUNG EVEN
WITH TOP OF PLATFORM

SUPPORT CONNECTION
AT EACH LADDER RAIL
SEE STF05501-07
THRU STF05501-09

GUIDE CONNECTION
AT EACH LADDER RAIL
SEE STF05501-10
AND STF05501-11

BAR 2 1/2" x 3/8" FOR UNGUIDED LENGTH OF
10'-0" (3000) OR LESS
BAR 3" x 3/8" FOR UNGUIDED LENGTH OF
GREATER THAN 10'-0" (3000)
TO 18'-0" (5400) MAX
C3X4.1 FOR UNGUIDED LENGTH OF
GREATER THAN 18'-0" (5400)
TO 29'-6" (8950) MAX

3/4" (20) DIAMETER SMOOTH BAR RUNGS AT 1'-0" (300)
SPACING C/C UNLESS OTHERWISE NOTED IN DESIGN DOCUMENTS (SEE STF05501-05)

FOR LADDER BASE DETAILS AT STRUCTURE/PLATFORM OR HORIZONTAL VESSEL, SEE STF05501-03
FOR LADDER BASE DETAILS AT VERTICAL VESSEL SEE STF05501-04

BOTTOM OF LADDER ELEVATION
(SEE DESIGN DOCUMENTS)

SIDE ELEVATION

NOTE THAT, IF TYPE 1 LADDER BASE DETAIL IS USED, THE UNGUIDED LENGTH AT BOTTOM OF LADDER MAY CONTROL THE RAIL SIZE.

DIMENSIONS ARE GIVEN IN FEET AND/OR INCHES. METRIC DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS, UNLESS OTHERWISE NOTED.
PLANN AT TOP
(SIDE-STEP LADDER)

ELEVATION AT TOP
(SIDE-STEP LADDER)

DIMENSIONS ARE GIVEN IN FEET AND/OR INCHES. METRIC DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS, UNLESS OTHERWISE NOTED.
LADDER RUNG DETAILS

1. CONNECTION TO STEEL OR GRATING AT ELEVATED PLATFORM:
LADDER FABRICATOR SHALL PROVIDE 2-CONNECTION BOLT ASSEMBLIES AT THE BASE OF EACH LADDER.
EACH CONNECTION BOLT ASSEMBLY SHALL CONSIST OF:
- 1-ASIM A325 5/8" (16) DIAMETER BOLTS, 1-NUT, 1-WASHER, AND 1-PLATE 2 1/2" x 2 1/2" x 1/4".

2. CONNECTION TO CONCRETE AT GRADE:
LADDER PAD INSTALLER TO PROVIDE LADDER PAD AND 5/8" (16) DIAMETER ADHESIVE ANCHORS.
(SEE PIP STF03310 FOR LADDER PAD DETAILS)

LADDER BASE DETAILS

DIMENSIONS ARE GIVEN IN FEET AND/OR INCHES. METRIC DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS, UNLESS OTHERWISE NOTED.
COORDINATE WITH DWG STF05501-01. WITH TYPE 1 LADDER BASE DETAIL, THE UNGUIDED LENGTH AT BOTTOM OF LADDER MAY CONTROL THE RAIL SIZE.

- 2'-6" (750) MAX FOR 2 1/2" x 3 1/2" RAILS
- 4'-6" (1350) MAX FOR 3 1/2" x 3 1/2" RAILS
- 7'-6" (2250) MAX FOR 4 1/2" x 4 1/2" RAILS

BOTTOM OF LADDER RAILS

LADDER BASE DETAILS AT VERTICAL VESSEL

1. CONNECTION TO STEEL OR GRATING AT ELEVATED PLATFORM:
   LADDER FABRICATOR SHALL PROVIDE 2~CONNECTION BOLT ASSEMBLIES AT THE BASE OF EACH LADDER.
   EACH CONNECTION BOLT ASSEMBLY SHALL CONSIST OF 1~ASTM A307 5/8" (16) DIAMETER BOLT, 1~NUT,
   1~WASHER, AND 1~PLATE 2 1/2" x 2 1/2" x 1/4".

2. CONNECTION TO CONCRETE AT GRADE:
   LADDER PAD INSTALLER TO PROVIDE LADDER PAD AND 5/8" (16) DIAMETER ADHESIVE ANCHORS.
   (SEE PIP ST103310 FOR LADDER PAD DETAILS)

3. VERTICAL POSITION OF ROD RELATIVE TO SLOTTED HOLE SHOWN IS BASED ON VESSEL AND LADDER AT AMBIENT TEMPERATURE.

LADDER BASE NOTES:

TYPE 2 (WITH CONNECTION AT BASE)

LADDER BASE DETAILS AT VERTICAL VESSEL

DIMENSIONS ARE GIVEN IN FEET AND/OR INCHES. METRIC DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS, UNLESS OTHERWISE NOTED.
SIDE-STEP LADDER SUPPORT

CONNECTION DETAILS TO VERTICAL VESSEL

1-7 1/2"

INSIDE FACE OF SUPPORT CONNECTORS TO VESSEL

SEE DESIGN DOCUMENTS FOR SUPPORT CONNECTORS TO VESSEL (FABRICATED BY VESSEL MANUFACTURER)

4 BOLTS

BY LADDER FABRICATOR

PLATES

BY LADDER FABRICATOR

PLAN

SIDE-STEP LADDER SUPPORT

CONNECTION DETAILS TO VERTICAL VESSEL

SEE DESIGN DOCUMENTS FOR SUPPORT CONNECTORS TO VESSEL (FABRICATED BY VESSEL MANUFACTURER)

4 PLATE AND SUPPORT CONNECTOR

(SEE DESIGN DOCUMENTS)

ELEVATION

SIDE-STEP LADDER SUPPORT

CONNECTION DETAILS TO VERTICAL VESSEL

(ONE SET PER LADDER)

DIMENSIONS ARE GIVEN IN FEET AND/OR INCHES. METRIC DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS, UNLESS OTHERWISE NOTED.
SIDE-STEP LADDER SUPPORT

CONNECTION DETAILS TO STRUCTURE/PLATFORM

DIMENSIONS ARE GIVEN IN FEET AND/OR INCHES. METRIC DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS, UNLESS OTHERWISE NOTED.

SEE DESIGN DOCUMENTS FOR SUPPORT CONNECTORS TO STRUCTURE/PLATFORM (FABRICATED BY STRUCTURE/PLATFORM FABRICATOR)

NOTE:
SEE DESIGN DOCUMENTS FOR LOCATION OF LADDER

SIDE-STEP LADDER SUPPORT
CONNECTION DETAILS TO STRUCTURE/PLATFORM

NOTE:
SEE DESIGN DOCUMENTS FOR SUPPORT CONNECTORS
TO STRUCTURE/PLATFORM (FABRICATED BY STRUCTURE/PLATFORM FABRICATOR)

PLATE AND SUPPORT CONNECTOR (SEE DESIGN DOCUMENTS)
PROCESS INDUSTRY PRACTICES
FABRICATION/INSTALLATION DETAILS
FIXED LADDERS FABRICATION DETAILS
LADDER GUIDE
CONNECTION DETAILS TO VERTICAL VESSEL

1'-7 1/2"
(500)
9 3/4"
(250)

INSIDE FACE OF GUIDES CONNECTOR TO VESSEL
SEE DESIGN DOCUMENTS FOR GUIDES CONNECTORS TO VESSEL (FABRICATED BY VESSEL MANUFACTURER)

ATTACHMENT SURFACE FOR GUIDE CONNECTOR AT VESSEL

4 BOLTS (BY LADDER FABRICATOR)
PLATES (BY LADDER FABRICATOR)

NOTE:
SEE DESIGN DOCUMENTS FOR LOCATION OF LADDER

PLAN
LADDER GUIDE
CONNECTION DETAILS TO VERTICAL VESSEL

4 1/16" (18) DIA HOLE IN CONNECTOR TO VESSEL AND (11/16" (18) DIA X 4" (100) LONG SLOTTED HOLE IN LADDER CONNECTION PLATE FOR 5/16" (8) DIA ASTM A307 BOLT WITH 2 NUTS (BY LADDER FABRICATOR) (INSTALL WITH BOLT HEAD TO INSIDE OF LADDER) NUTS SHALL BE HAND TIGHTENED NUTS SHALL BE JAMMED TO PROVIDE A 1/16" (2) CLEARANCE BETWEEN THE NUT AND THE CONNECTOR MEMBER

5/8" X 6"
DRILL EACH LADDER RAIL FOR BAR RAIL (BY LADDER FABRICATOR) SEE DETAIL THIS DRAWING FOR PLATE CONNECTION TO CHANNEL RAIL SLOT AND PLATE

VESSEL

1 1/2" (35)
(VERTICAL POSITION OF BOLT RELATIVE TO SLOTTED HOLE SHOWN IS BASED ON VESSEL AND LADDER AT AMBIENT TEMPERATURE)

5" (130)
UNLESS OTHERWISE NOTED IN DESIGN DOCUMENTS

ELEVATION
LADDER GUIDE
CONNECTION DETAILS TO VERTICAL VESSEL

1/4 (6)

LADDER RAIL

4 RUNGS

1/8"

3/16 (5)

PLATE CONNECTION TO CHANNEL RAIL

DIMENSIONS ARE GIVEN IN FEET AND/OR INCHES. METRIC DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS, UNLESS OTHERWISE NOTED.
PROCESS INDUSTRY PRACTICES
FABRICATION/INSTALLATION DETAILS
FIXED LADDERS FABRICATION DETAILS
LADDER GUIDE
CONNECTION DETAILS TO STRUCTURE/PLATFORM

ATTACHMENT MEMBER
FOR GUIDE CONNECTOR
AT STRUCTURE/PLATFORM
PLATES
FOR LADDER
(FABRICATOR)
BOLTS
FOR LADDER
(FABRICATOR)
Rungs

1'-7 1/2"
INSIDE FACE OF
GUIDE CONNECTORS
TO STRUCTURE/PLATFORM
SEE DESIGN DOCUMENTS FOR
STRUCTURAL MEMBER AND
GUIDE CONNECTORS
TO STRUCTURE/PLATFORM
(FABRICATED BY
STRUCTURE/PLATFORM FABRICATOR)

NOTE:
SEE DESIGN DOCUMENTS
FOR LOCATION OF LADDER

PLAN

LADDER GUIDE
CONNECTION DETAILS TO STRUCTURE/PLATFORM

SEE DESIGN DOCUMENTS FOR
GUIDE CONNECTORS TO
STRUCTURE/PLATFORM
(FABRICATED BY
STRUCTURE/PLATFORM
FABRICATOR)

Bolt, Hole, Slot
Connector and Plate
(See Design Documents)

STRUCTURE/PLATFORM

5" (130)
UNLESS OTHERWISE
NOTED IN
DESIGN DOCUMENTS

ELEVATION

LADDER GUIDE
CONNECTION DETAILS TO STRUCTURE/PLATFORM

DIMENSIONS ARE GIVEN IN FEET AND/OR INCHES. METRIC DIMENSIONS
IN PARENTHESES ARE IN MILLIMETERS, UNLESS OTHERWISE NOTED.
SIDE ELEVATION

OPTIONAL CAGE WITH
INTERMEDIATE ACCESS
TO SIDE-STEP LADDER

BAR 2" x 1/4" INTERMEDIATE HOOP
SEE STF05501-14

OMIT 2 VERTICAL BARS FOR ACCESS BETWEEN LADDER AND PLATFORM

BAR 3" x 1/4" HOOP (IDENTICAL TO TOP HOOP OF SIDE-STEP LADDER;
SEE STF05501-14)
TOP OF PLATFORM GUARD
AND TOP OF HOOP
(PLATFORM GUARD NOT SHOWN FOR CLARITY)

BAR 2" x 1/4" INTERMEDIATE HOOP
BELOW PLATFORM
SEE STF05501-14

TOP OF RUNG EVEN WITH TOP OF PLATFORM
TOP OF PLATFORM (WALKING SURFACE)

VERTICAL BARS AND HOOP ON FAR SIDE NOT SHOWN FOR CLARITY

DIMENSIONS ARE GIVEN IN FEET AND/OR INCHES. METRIC DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS, UNLESS OTHERWISE NOTED.
**Process Industry Practices**

**Fixed Ladders Fabrication Details**

**Optional Cage – Top Hoop Connection Details to Guard Post**

**Through Ladder (W/ Cage)**

**Top Hoop Connection to Angle Guard Post**

**Side-Step Ladder (W/ Cage)**

**Top Hoop Connection to Angle Guard Post**

**Top Hoop Bar 3" x 1/4"**

**Pipe Guard Post (Top Rail Not Shown)**

**Pipe Guard Post (Top Rail Not Shown)**

**Top Hoop Bar 3" x 1/4"**

**Pipe Guard Post (Top Rail Not Shown)**

**Top Hoop Bar 3" x 1/4"**

**Pipe Guard Post (Top Rail Not Shown)**

**Top Hoop Bar 3" x 1/4"**

**Pipe Guard Post (Top Rail Not Shown)**

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**Dimensions Are Given in Feet and/or Inches. Metric Dimensions in Parentheses Are in Millimeters, Unless Otherwise Noted.**
DETAIL
HOOP CONNECTION TO PLATE AT LADDER GUIDE OR SUPPORT CONNECTOR

DETAIL
HOOP CONNECTION TO CHANNEL RAIL

DETAIL
CAGE AT GAP BETWEEN LADDER SEGMENTS

LADDER GUIDE OR SUPPORT CONNECTOR (SEE DRAWINGS STE05501-07 THROUGH STE05501-11)

PLATE WELDED TO LADDER RAIL (BY LADDER FABRICATOR)

C3 RAIL

INTERMEDIATE HOOP BAR 3/4 X 1/2 AT TOP OF LOWER CAGE SEGMENT SEE STF05501-14

INTERMEDIATE HOOP BAR 3/4 X 1/2 AT BOTTOM OF UPPER CAGE SEGMENT SEE STF05501-14

@ LADDER

@ GAP BETWEEN LADDER SEGMENTS (SEE DESIGN DOCUMENTS)

@ (40)

@ (20)

@ (20)

DIMENSIONS ARE GIVEN IN FEET AND/OR INCHES. METRIC DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS, UNLESS OTHERWISE NOTED.
NOTE:
SEE DESIGN DOCUMENTS FOR WHETHER A STANDARD FLARED CAGE IS REQUIRED AND WHETHER EXTENDED VERTICAL BARS ARE TO BE PROVIDED AT BACK AND/OR SIDE.

PLATFORM GUARD
(TOP RAIL)

LADDER
SEE DESIGN DOCUMENTS FOR LOCATION

EXTENDED VERTICAL BARS
CONNECTED AT GUARD

WELD ADDITIONAL VERTICAL BAR 1 1/2" x 1/4"
FOR CORNER CONDITION

EXTENDED VERTICAL BARS
CONNECTED AT GUARD

PLAN

LADDER CAGE DETAILS AT ELEVATED PLATFORM

INSIDE EDGE OF TOP RAIL
3/4" (20)

VERTICAL BAR
1 1/2" x 1/4" (BY LADDER FABRICATOR)

CONNECT BAR 3" x 1/4"
(BY GUARD FABRICATOR)

T.O. RAIL
(ANGLE SHOWN: PIPE SIMILAR)

DETAIL 1

BOTTOM OF CAGE ELEVATION
(SEE DESIGN DOCUMENTS)

3 ~ BARS 1 1/2" x 1/4"
EQUALLY SPACED BETWEEN BOTTOM OF CAGE AND TOP OF GUARD

SEE DETAIL 1 FOR TYP CONNECTION OF VERTICAL BARS TO TOP RAIL OF GUARD

TOP OF PLATFORM GUARD

3/16 (5) TYP

GUARD POST

EXTENDED VERTICAL BARS

SECTION A-A

DIMENSIONS ARE GIVEN IN FEET AND/OR INCHES. METRIC DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS, UNLESS OTHERWISE NOTED.